

REMARKS

Applicants provide the following comments in response to the Office Action mailed August 27, 2003. Claims 1, 2, 4, and 5 are pending. Non-elected claim 3 has been cancelled. A translated copy of the entire '713 reference (JP10-289713) has been included with this response.

35 U.S.C. § 102(b) Rejection

Claims 1, 2, 4, and 5 were rejected under 35 U.S.C. § 102(b) as anticipated by Matsumoto et al. (U.S. Pat. 4,251,603) and further by the '713 reference (JP10-289713). Applicants respectfully traverse these rejections.

The Matsumoto Reference

Matsumoto discloses an electrode using a sponge-like porous metal matrix having a multiplicity of cells connected with each other. The cells in the metal matrix can be impregnated with active material to form an electrode. The sectional areas in the metal matrix continuously decrease from the surface of the matrix toward the center of the matrix. (Matsumoto, col. 3, ll. 58-67). In other words, the amount of empty space in the un-impregnated matrix decreases as you move toward the center of the matrix. The smaller sectional spacing in the center of Matsumoto matrix limits the amount of active material which can be placed therein. This allows the matrix to hold more overall active material while maintaining the strength necessary for the matrix to be used in a battery. (Matsumoto, col. 2, line 68 - col. 3, line 10). Thus, the center of the matrix in Matsumoto acts as a spine for the electrode.

Claim 1 requires an electrode plate with a larger porosity in the intermediate portion of the electrode than at the surface part of the electrode. The additional porosity in the intermediate portion of the plate prevents swelling of the electrode, thereby maintaining the efficiency of the electrode during continued usage. Nowhere does Matsumoto teach varying the porosity of the electrode composition (by "porosity" the applicant means the ratio of "pore volume" to the entire volume of the electrode plate, where the "pore volume" corresponds to the portion of the electrode that is not filled with either the active material or binding agent, thus, "pore volume" includes the volume of any pores in the active material itself) (Application, p. 4, ll. 11-14). In

fact, Matsumoto specifically mentions that "a greater amount of active material is capable to be impregnated regardless of the same porosity of the whole structure . . ." (Matsumoto, col. 3, ll. 5-7). Thus, the Matsumoto reference fails to disclose an electrode having a porosity greater at the intermediate part of the electrode than at the surface part. Since Matsumoto fails to teach this aspect of claim 1, it cannot anticipate claim 1, nor claims 2, 4, and 5 which depend from claim 1.

The '713 Reference

The pending claims were also rejected as anticipated by the '713 reference. Nowhere does the '713 reference discuss varying the amount of porosity within the electrode. Thus, this reference could only anticipate the claimed invention if the method disclosed therein inherently produces an electrode having a higher porosity in its intermediate part than in its surface part.

The '713 reference discloses the use of an embossed roller and a flat roller to compress the active material contained within a porous body to produce an electrode with a higher overall density of active material. The embossed roller employs a very fine pattern that would not affect the surface of the electrode. As the '713 reference discusses, the embossed roller permits air to escape from the electrode plate during pressing. The pressing steps are both conducted "similarly," at a pressure of 400 kg/cm². (See Abstract and Example sections of '713 reference).

Both pressings in the '713 process occur in a similar manner; at the same pressure. Because there is no pressure differential in the pressing steps, there is no reason to expect that the method disclosed in the '713 reference would produce an electrode having an increased porosity in the intermediate portion. Accordingly, the process disclosed in the '713 reference would not inherently produce a product having the porosity properties required by claim 1. Therefore, the '713 reference does not inherently anticipate the claimed invention.

In view of these remarks, Applicant respectfully requests reconsideration of the application and allowance of all pending claims.



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Respectfully submitted,

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